BEFORE
THE PUBLIC SERVICE COMMISSION
OF SOUTH CAROLINA

DOCKET No. 2001-65-C

IN THE MATTER OF:)
)
Generic Proceeding to Establish Prices)
For BellSouth's Interconnection Services,)
Unbundled Network Elements and Other)
Related Elements and Services)
)

DIRECT TESTIMONY OF

DEAN FASSETT

On behalf of

New South Communications, NuVox Communications, Broadslate Networks, ITC^DeltaCom Communications, KMC Telecom

Public Version

JUNE 4, 2001

TABLE OF CONTENTS

EXHIBITS

I. INTRODUCTION

Q. PLEASE STATE YOUR NAME AND BUSINESS ADDRESS.

A. My name is Dean R. Fassett and my business address is 141 Juniper Drive, Ballston Spa, New York, 12020.

Q. BY WHOM AND IN WHAT CAPACITY ARE YOU EMPLOYED?

A. I am the owner of Adirondack Telecom Associates. I provide telecommunications consulting services concerning outside plant infrastructure design, construction and engineering issues.

Q. ON WHOSE BEHALF ARE YOU TESTIFYING?

A. I am testifying on behalf of New South Communications, NuVox Communications, Broadslate Networks, ITC DeltaCom Communications, and KMC Telecom, referred to in my testimony collectively as the "Competitive Coalition."

Q. PLEASE SUMMARIZE YOUR BACKGROUND IN OUTSIDE PLANT ENGINEERING AND CONSTRUCTION.

A. I have over 30 years of telecommunications experience in outside plant engineering and construction. Prior to my retirement from NYNEX in May 1996, I had outside plant engineering and construction responsibilities for the Adirondack District as the Area Operations Manager. This work included both the actual performance of outside plant engineering work and the supervision of construction personnel performing those tasks. Before that assignment, I was the Engineering Manager for the Capital South District. In this capacity, I was responsible for all engineering operations for the design and construction of the local network within an area that encompassed metropolitan, suburban and rural environments.

Since my retirement from NYNEX, I have continued to work in the outside plant engineering and construction arena working as a contract engineer and operations manager on various projects. In summary, I have had a wide range of hands-on experience that includes urban, suburban and rural network construction. From late 1998 and until recently I was responsible for company operations and engineering at Frontier Communications of AuSable Valley in upstate New York, a small ILEC that until recently was an independent company. In that capacity, I was responsible for the planning, engineering design and construction of all OSP projects, including coordination with other utilities and service providers, preparation and awarding of outside contracts and acquisition of material and test equipment. My Curriculum Vitae is included as **Exhibit DRF-1** to this testimony.

Q. WHAT IS THE PURPOSE OF YOUR TESTIMONY AND HOW IS IT ORGANIZED?

A. Following this introductory section, my testimony is organized in the following fashion:

- Section II responds to BellSouth's (also referred to herein as "BST") proposal that loops used to provide digital subscriber line services ("xDSL" or "DSL" loops) be priced substantially higher than voice grade loops. I explain that, from an engineering point of view, xDSL services utilize the same loop facilities that ILECs use to provide voice grade services. I also provide reasonable work times to provision xDSL loops.

- Section III addresses BellSouth's nonrecurring charges for voice grade (SL-1 and SL-2) loops and its new unbundled copper loop - nondesigned. I explain that BellSouth has overstated the work necessary to provision these loops by assuming manual intervention will be required and by including unrealistic work times.
- Section IV addresses ISDN loops, DS-1 local loop facilities and high capacity loops including DS-3's, OC-3's, OC-12's and OC-48's. BellSouth's cost studies include unsupported task times for these loops that are unreasonable in a forward looking, efficient network environment.
- Section V addresses line conditioning ("loop modification" as BellSouth calls it). Loop conditioning should not be necessary in a forward looking network. However, I have offered alternatives to the work times BellSouth has proposed based on my first hand experience in performing this type of work.

II. xDSL-CAPABLE LOOPS

A. Facilities Used For xDSL-Capable Loops Are The Same As Those Used For Voice Grade Loops

Q. DO BELLSOUTH'S COST STUDIES GIVE THE IMPRESSION THAT XDSL CAPABLE LOOPS ARE COMPLICATED TO PROVISION?

A. Yes. BellSouth's cost studies, with the variety of xDSL capable loops offered and the enormous nonrecurring charges for those loops, create the impression that DSL providers are asking BellSouth to perform extraordinary tasks when they order an xDSL capable loop. Whether the requested xDSL loop is "designed" or not, BellSouth still incorporates high fallout probabilities, overstated tasks times and unnecessary work functions. In a properly managed, efficient operating environment these inefficiencies would not exist.

Q. HOW DO XDSL-CAPABLE LOOPS DIFFER FROM VOICE-GRADE LOOPS?

A. The facilities used to provide xDSL services are identical or nearly identical to those used to provide voice-grade services in forward looking local networks. In fact, for loops that would be provisioned entirely on copper xDSL-capable loops are identical to loops used to provide voice-grade service. BST witness Milner acknowledged as much at page 12 of his direct testimony:

> Significantly, the same copper loops that are used to provide DSL services are also utilized to provide voice service to BellSouth's customers, as well as to other CLECs' customers.

Q. CAN BELLSOUTH PHYSICALLY PROVISION XDSL-CAPABLE LOOPS OVER THE SAME EXISTING FACILITIES THAT IT USES TO PROVISION VOICE-GRADE LOOPS TODAY?

A. Yes. In fact, in his testimony BST witness Milner describes BellSouth's developing network as one that would be enable BellSouth to provide xDSL capable loops over the same facilities on which it provides voice services. For all-copper loops up to 18,000 feet in length, competitors providing xDSL services need nothing more than a basic loop free of devices that interfere with xDSL-based services.

Q. ARE THE ILEC COST STUDIES SUBMITTED IN THIS PROCEEDING CONSISTENT WITH THAT FACT?

A. No, not at all. BellSouth's cost studies submitted in this docket distort the nature and requirements of xDSL service providers.

B. <u>BellSouth Dramatically Increases the Cost of xDSL Loops by Including Unreasonable Work Times Invalid Assumptions in Its Cost Studies</u>

Q. SHOULD THE COMMISSION RELY UPON THE BST ANALYSIS OF THE NONRECURRING COST TO PROVISION VARIOUS TYPES OF UNBUNDLED LOOPS FOR USE TO PROVIDE XDSL SERVICES?

A. No. I have reviewed the BellSouth cost study filed April 25, 2001 supporting BellSouth's proposed rates for xDSL loops in South Carolina. A copy of pertinent pages of this study is attached as **<u>Exhibit DRF-2.</u>** The connection of an xDSL loop should involve only a few basic tasks to connect a copper loop to a collocation facility in the central office. There are three fundamental problems with BellSouth's cost studies: (1) some of the work groups BellSouth claims are necessary to provision loops should not be involved in provisioning in an efficient, forward looking network; (2) many of the probability factors for how often certain activities will be necessary, e.g. dispatch or fallout, are flawed; and (3) the assumptions about how much work time is required to perform the tasks described are inflated.

Q. PLEASE DESCRIBE YOUR REVIEW OF BELLSOUTH'S WORK GROUPS AND TASK TIMES IN THE xDSL COST STUDIES?

A. BellSouth classifies work groups involved in loop provisioning into three general categories: Service Inquiry, Engineering and Connect & Test. I will explain why the functions performed by some of these work groups are unnecessary and why many of BellSouth's probability factors are inappropriate. Where the function in the study is necessary but the work time included is inflated, I have recommended reasonable work times. My recommendations are based on my personal experience from 30 years I outside plant engineering. I will address the xDSL cost study using these categories included in the study.

Q. FIRST, CAN YOU EXPLAIN HOW THE XDSL COST STUDY IS ORGANIZED?

A. Yes. Pages 9-13 of **Exhibit DRF-2** describe the work groups within BellSouth involved in provisioning these loops. The activities undertaken by each group are listed in column A. The time for each activity is shown in column E (Initial Install). Probabilities and fallout factors are shown in columns I-K. The activities and any probabilities and fallout are applied to generate costs for each of a number of different xDSL loop products. These calculations are reflected on pages 2-8 of the exhibit.

1. <u>Task Group 1: Service Inquiry</u>

Q. IS SERVICE INQUIRY WORK TIME ALWAYS INCLUDED?

A. No. The service inquiry category is not included when a CLEC electronically accesses Bellsouth's systems and performs it's own service inquiry. Bellsouth includes costs for loops with and without service inquiry. Bellsouth refers to these loop products as those "with or without loop makeup."

Q. PLEASE DESCRIBE THE FUNCTIONS IN THE SERVICE INQUIRY CATEGORY

A. BST assumes that the Complex Resale Services Group ("CRSG") will require 31.9 minutes of "Service Inquiry" work to manually determine the loop makeup. (See page 9-Row 15/Column E of <u>Exhibit DRF-2</u>) A forward-looking analysis should instead assume that the CLEC has access to the ILECs electronic Operations Support Systems ("OSS") that include the necessary data to qualify its own loops, eliminating the need for any manual loop make-ups. If electronic databases have been properly maintained, the fallout probability in this process should be less than 5% (rather than BST's 100%) and it should take no longer than 5 minutes to resolve on average. The order should be submitted electronically to the ILEC, and should flow through to provisioning without manual intervention. For these reasons, these costs should be reduced to the levels I have recommended, which are conservative premised on considering forward looking costs.

Q. DOES THE ABILITY TO ORDER LOOPS WITHOUT LOOP MAKEUP ELIMINATE ANY CONCERN ABOUT THE SERVICE INQUIRY TIMES?

A. No. Although BellSouth has eliminated some of these unnecessary service inquiry functions when the CLEC performs its own loop qualification (and thus orders a loop without loop makeup), many unnecessary, manual processes remain when a CLEC orders a loop with loop makeup. It is important that the Commission adjust rates for both loops with and loops without loop makeup for two reasons. First, at the time of this filing to my knowledge, no CLECs in South Carolina can obtain loop makeup electronically in advance of ordering a loop. Although BellSouth is beta testing this electronic process, the reality is that CLECs today must order a loop with loop makeup or else obtain a separate manual loop makeup in advance of ordering the loop. It is my understanding that this process adds 5-7 business days to the front end of the ordering process at a cost of $50. The specific rates are included as rate elements J.3.3 and J.3.4. Thus, although BellSouth purports to have both loops with and loops without loop makeup available, the only real choice for CLECs at this time is to obtain manual loop makeup from BellSouth. As a result, the task times BellSouth assigns to these processes must be carefully analyzed.

2. Task Group 2: Engineering

Q. PLEASE DESCRIBE THE ENGINEERING CATEGORY.

A. Three BST work groups are involved in engineering.

- **Service Advocacy Group ("SAC").** For xDSL loops orders with loop makeup, the SAC spends 36.4 minutes on every order per Bellsouth's cost study. See, for example, the 2-wire HDSL loop – page 3 of Exhibit DRF-2 - cell D50 (16.4 minutes) + cell D51 (20 minutes). BellSouth has assumed that 10% of the orders will fallout in this process and then has applied overstated task times to correct those orders. It would be more reasonable to assume that 2 % of the orders may drop out and that these orders would require 10 minutes to resolve on average in this process or a total of .2 minutes on every order.

- **Address and Facility Inventory group ("AFIG").** This group would be responsible assigning loop facilities on orders that have fallen out of the mechanized assignment process. BellSouth has assumed that their electronic database system will fail an amazing 30% of the time in this process and that engineering will spent 8 minutes to correct the assignment or 2.4 minutes on every order. See, for example the 2-wire HDSL loop- page 3 of Exhibit DRF-2 - cell D53. As an engineer and operations manager who has actually been responsible for an assignment organization, this assumption is difficult to accept. It would be much more reasonable to assume that 2 % of the orders may require manual intervention in this assignment process and those should be resolved within 5 minutes or .1 minutes for every order. As database systems are updated and corrected, these occurrences should continue to decline, especially in an efficient, forward looking network.
- **Circuit Provisioning Group ("CPG").** This group processes requests, designs circuits, and generates design layout record ("DLR") & WORD document for CLEC and Field. See page 10 of Exhibit DRF-2, rows 19 and 20. This task appears to consist of two distinct time estimates for correcting

fallout in the automated engineering process at two different points, which take 15 and 18 minutes respectively. BST assumes that each type of fallout will occur on 15% of all xDSL orders and results in 4.95 minutes charged to every order. It would be appropriate to assume a fallout probability of 2 to 5 % with a task time of 10 minutes to resolve, which equates to a maximum of .5 minutes on every xDSL order.

3. Task Group 3: Connect & Turn-Up Test

Q. PLEASE DESCRIBE THE CONNECT & TURN-UP TEST CATEGORY.

The work groups and tasks in this section of the study are identified on pages 11 and 12 of Exhibit DRF-2.

- **UNE Center Group** For 2-Wire HDSL capable loops BST assumes 118.26 minutes of work by the UNE center. See page 3, cell D57 of the exhibit. BST describes these work functions on page 11 of the exhibit. ***Testing:*** UNE Center cost for testing those loops is greatly overstated. For example, the UNE Center time includes functions such as "ensures dispatch" meaning that a UNE Center employee literally checks to make sure that BST's automated systems did not fail to schedule the dispatch of a field technician to coordinate the testing process with the UNE Center. This is obviously unnecessary and should be removed from a forward-looking cost study. The most extreme example of how BellSouth overstates the UNE center costs is that BST's study appears to assume that this workgroup will spend a total of between 53.6 and 84 minutes to test continuity, due date coordination and test, depending on the type of xDSL loop ordered. See page 11, rows 19-21. A continuity test is one of the most routine, simple and rapid activities in central office operations. If required at all, it is typically done at the same time a connection is made and involves little more than clipping standard test apparatus onto the newly completed connection. This task should take substantially less than one minute and should only be done once at most. In my opinion, conservatively 5 minutes on 2 % of the non-designed loops and 5 minutes on 100 % of the designed orders would be adequate for the work activity for an efficient equivalent of the UNE Center testing process.

Manual Functions: BST includes manual work time to "pull" the order, to "assign to work force," to "ensure accuracy of design," to "ensure dispatch." See page 11, rows 14-18 of Exhibit DRF-2. Forward looking OSS used by efficient ILECs have automated all of these activities and should not require any standard manual intervention. BST apparently has mechanized at least some of these tasks but, ironically, has built in a 100% manual backup to make sure, for example, that the automated dispatch that should have been scheduled automatically was actually scheduled. Also, BST includes both time to manually contact customer and to manually "complete order," two tasks that should accomplish the same objective.

- **Special Services Installation & Management ("SSI&M").** For xDSL-capable loops, BST has assumed that it will take installation forces 118.26 minutes of work time plus 20 minutes travel on every xDSL capable loop. See Exhibit DRF-2, page 3, cells D57 and D56. BST's analysis again overstates task times. xDSL loops will not require a dispatch in 100% of cases under any reasonable set of assumptions. In a forward-looking network, the Commission should not assume that an xDSL loop will require a dispatch of outside plant technicians any more often than is required for a basic loop, which should be in the 10 to 15 % range. BST's 118.26 minute total task time includes the following activities and times as shown on page 12 of Exhibit DRF-2:

1) 20 minutes "Process Request"
2) 16 minutes for "Place/removes cross-connect at crossbox."
3) 15 minutes to "Checks continuity and dial tone"
4) 45 minutes for "Trouble resolution at crossbox" on 30% of all orders.
5) 23 minutes "Tests from NID & tags loop"
6) 56 minutes "Trouble resolution at premise" on 21% of all loops.
7) 19 minutes " Completes order"

Each of these estimates greatly exaggerates the time required, on average, for a qualified technician to perform the required task. BST has assumed that 100% of the loops will require the placement of a cross-connection at the crossbox. An efficient, forward looking network would have a high percentage of cable pairs that are already cross-wired at the crossbox or in a "Cut-through" or "Connect-through" state. BellSouth has also assumed that 30% of the loops will require "trouble resolution at the crossbox" and another 21% will require "trouble resolution at the premise". Not only are these trouble assumptions extremely high, but the task times BST assumes to resolve them are overstated.

Dispatch should only be required on 20% of the designed xDSL loops. The dispatch work time should not exceed 50 minutes. An additional 20 minutes of travel time would added for the 20% of loops requiring dispatch. Likewise, the cumulative presumed error rate reflected in items 4 and 6 in the list above is totally inconsistent with the performance level one would expect from an efficient service provider with a forward looking designed network. BST has provided no support whatsoever for its assumptions and therefore has failed to prove that they form the reasonable basis for a forward looking rate. I recommend allowing BST to include only a maximum of a 5% occurrence for each type of error or trouble.

- **Work Management Center ("WMC")**. BST reports 2 minutes on every order for the "WMC" group to "coordinate dispatched technicians." See page 12, row 42 of Exhibit DRF-2. BST's alleged need for yet another layer of manual coordination is contrary to efficient engineering practices using forward-looking OSS. BellSouth has not provided any justification supporting this function. In an efficient forward looking environment technicians receive their workloads electronically with hand held computers such as CATs (craft access terminals). The Commission should reject BellSouth's proposed costs on this loop and adopt the task times that I have recommended. The Commission should not allow any or very minimal recovery for this group. It would be conservative to assume a probability of 5% with a task time of 2 minutes or .1 minutes on every order.

- **<u>Central Office Installation & Management ("CO I&M")</u>**. BST includes 20 minutes for 85% of loops for this group to "wire circuit at collocation site." See page 12, row 46 of the exhibit. Based on the July 20, 2000 deposition of Mr. Daniel Eric Stinson (the BellSouth subject matter expert on CO I&M), it appears that this is based on an assumed ten minutes to review the order and walk to the frame location, and five minutes to run each of two frame jumpers one on the main distribution frame and another to connect a BST remote test head (thereby making the loop "designed"). Other than the assumption that a second jumper is required to include a designed test point, I agree that the basic functions for this work group are required. However, I do not agree with the BST time estimates and have presented my own recommended alternative times for those functions earlier in this section of my testimony. If and only if the Commission approves BST's recommendation to design in a test point, I recommend that this task should take a total of 11 minutes. On orders without test points, I would think that 8 minutes would be adequate to perform the necessary work task. My estimate is based on my own experience performing and supervising the performance of this function.

Q. PLEASE SUMMARIZE THE FINDINGS YOU HAVE JUST PRESENTED REGARDING XDSL LOOP COSTS.

A. The following table compares the BST reported times by function with work times for the 2-wire HDSL loop with loop make up (rate element A.7.5) with more appropriate work times for the same loop with and without the design process. Again, I do not believe the design process is necessary or appropriate in a forward-looking network.

Group or Function	BST Cost Study 2W HDSL	Realistic Time Assumption 2W HDSL Without Design Process	Realistic Time Assumption 2W HDSL With Design Process
Group 1: Service Inquiry	31.9 minutes for every 2W HDSL capable and copper loop	5 Minutes on 5% of the orders (Should be mechanized) .25 min/order	10 Minutes on 10% of orders (1.0 min/order)
Group 2: Engineering	43.75 Minutes for every 2W HDSL compatible loop order w LMU	SAC 10 minutes on 2% of orders (.2 min/order) AFIG 5 minutes on 2% of orders (.1 min/order)	SAC 10 minutes on 2% of orders (.2 min/order) AFIG 5 minutes on 2% of orders (.1 min/order) CPG 10 minutes on 2-5% of orders (.5 min/order)
Group 3: CONNECT & TEST (UNEC or CWINS)	112.77 minutes for every 2W HDSL loop order	5 minutes on 2% of the loop orders (.1 min/order)	5 Minutes additional time for test at the MDF at time of installation
Group 3: CONNECT & TEST (WMC)	2 Minutes per loop	"2" Minutes on 5 % of the loop orders (.1 min/order)	"2" Minutes on 5 % of the loop orders (.1 min/order)
Group 3: CONNECT & TEST (CO I & M)	17 minutes on every xDSL compatible loop order	8 Minutes on 100% of loops	11 Minutes on 100% of loops
Group 3: CONNECT & TEST (SSI&M)	118.26 Minutes on every xDSI compatible loop order plus 20 minutes of travel time	25 Minutes on 5% of the 2W HDSL compatible loop orders, Plus 20 minutes of travel time (2.25 min/order)	50 Minutes total for 20% of loops (includes 5% additional error correction time) Plus 20 minutes of travel time (14 min/order)
Approximate Cost	328.68 Minutes total per order $259.04 per 2W HDSL w/LMU (Exhibit DDC-9, page 1, Cost Element A.7.5)	11.0 minutes total per order $ 8.35 per 2W HDSL without design process	31.9 minutes total per order $24.21 per 2W HDSL with design process

Q. PLEASE COMMENT ON THE TESTING AND TROUBLE RESOLUTION TASK TIMES THAT BELLSOUTH HAS INCLUDED IN ITS COST STUDIES FOR XDSL AND OTHER COPPER LOOPS.

A. It is apparent that Bellsouth has assumed that two technicians are required to perform testing and resolve troubles. The currently available test and measurement sets allow a <u>single</u> technician to complete these work tasks. For example, 3M's model 965 DSP-SA Time Domain Reflectometer (TDR) permit a single technician to complete the following tests or measurements: Resistance (Ohms), Foreign Battery, Shorts, Grounds, Opens, Presence of Load Coils, Capacitance, Loss (Db), number of ringers, Pre-qualify xDSL, 56 Kb, 64 Kb, ISDN, HDSL, and T-1 or DS-1 facilities. If additional test measurements are desired, the 965 test set can be operated with a "Far End Device" (FED) either placed at the central office or customer premise. Again a single technician can perform these tests, eliminating the requirement for two technicians. TDR's are also referred to as "Cable Radars or Echometers" since it utilizes Radar technology to locate cable faults.

III. VOICE GRADE (SL-1 & SL-2) LOOPS AND UNBUNDLED COPPER LOOPS-NONDESIGNED ("UCL-ND")

Q. ARE THE ASSUMPTIONS IN BELLSOUTH'S COST STUDIES FOR SL-1, SL-2, AND UCL-ND LOOPS REASONABLE?

A. Not at all. As I mentioned earlier in my testimony, BellSouth has assumed a high rates of fallout and utilizes greatly exaggerated work times to correct any problems during the provisioning process They have assumed that it will be necessary to dispatch a technician 38% of the time for SL-1 and UCL-ND loops and 100 % of the time for SL-2 loops. Efficiently operating networks should only require dispatch on 10 to 15 % of their orders and as networks are modernized the need to dispatch technicians should decrease further.

Q. PLEASE EXPLAIN.

A. In the cost studies for these loops, BellSouth uses the same classification of work groups described above for the xDSL loop study. The first set of work times in the BellSouth study for SL-1's,SL-2's and UCL-ND are in the engineering group. While BellSouth has correctly assumed that these orders will be submitted electronically and will flow through BellSouth systems directly to provisioning groups, they have assumed high fallout and dispatch rates. In its cost study, BellSouth has assumed that on 10% of these orders, BellSouth's electronic data base system will fail and it will be necessary for the Service Advocacy Center ("SAC") to correct the problem with the order for a total of 60 minutes (See cells E7 & E8 of the Inputs_Engineering worksheet for the 2-wire SL1 loop). That means that on every SL-1, SL-2 and UCL-ND loop order, BellSouth charges

CLECs for 6 minutes of SAC time. These orders should flow through without the need for manual intervention in only a very limited number of cases, certainly not 1 out of every 10 orders. It would be reasonable to assume that fallout may occur 2% of the time and it would take on average 10 minutes to correct or .2 minutes on every SL-1, SL-2 and UCL-ND order.

BellSouth then assumes that it will be necessary for engineering to spend another 8 minutes on 30% of the orders to assign facilities in the Address Facility Inventory Group ("AFIG"). The times for the SL-1, SL-2 and UCL-ND loops for the AFIG are identical to the times in the xDSL study (Exhibit DRF-2). This is another process that should be completed electronically by an efficient service provider. The high fallout rate means that BellSouth's electronic facility assignment system fails one out of three times. An efficient carrier would not and could not tolerate those levels of failure. In fact, in my time at NYNEX, we were constantly monitored and evaluated on how well we **decreased** fallout from electronic systems. I find it hard to believe that BellSouth does not have in place similar objectives. The Commission should not endorse inefficient processes like this. At most, the Commission should only allow a 2% fallout to be handled by AFIG within 5 minutes or .1 minutes per order.

Q. ARE THE WORK TIMES FOR THE UNEC GROUP LIKEWISE INFLATED IN BELLSOUTH'S COST STUDY FOR SL-1, SL-2, AND UCL-ND LOOPS?

A. Yes. My earlier analysis of the UNE Center functions in the xDSL cost study apply equally to the cost studies for these loops. These tasks within the UNE center appear to be "busy work" with one group needlessly checking on another, for example "ensures dispatch." One of the most remarkable assumptions is the function described as "performs frame continuity and due date coordination and testing." If needed at all, this function should only take a few minutes. BellSouth has assumed that the UNEC will require 27.84 minutes for SL-1's (See cell E15 of worksheet WP100 of the SL1 cost study) and UCL-ND loops and 101.73 minutes for SL-2's (See cell D37 of worksheet WP100 of the SL2 cost study). My recommendation would be to permit a fallout rate of 2% with a 5 minutes task time in the UNEC process for non-designed loops (SL-1's & UCL-ND) and a 100 % probability with a 5minute task time in the UNEC for designed or SL-2 loops.

Q. YOU MENTIONED THAT BELLSOUTH'S ASSUMMED DISPATCH RATES OF 38% FOR SL-1 AND UCL-ND LOOPS AND 100% DISPATCH RATE FOR SL-2 LOOPS IS UNREASONABLE. PLEASE EXPLAIN FURTHER.

A. Yes. It certainly is not reasonable to assume that it would be necessary to dispatch a technician on 38% of the SL-1 and UCL-ND loop orders and 100 % of SL-2 loop orders. Outside plant networks are designed to minimize the need to dispatch technicians to the field. Facilities have been pre-connected or pre-assigned between the customer's premise and central offices as "cut throughs", "connect throughs" or "CT's" which eliminates the need and expense of sending technicians to the field. In fact, when I managed outside field technicians at NYNEX, I was evaluated on how effectively I decreased the number of truck rolls necessary to provision service. Because of the high cost associated with truck rolls, all incumbent carriers should be working toward reducing dispatch rates, not increasing them.

The dispatch rate means that BellSouth has assumed that cumulatively outside technicians will spend 48.98 minutes of work time plus 7.6 minutes of travel time on every SL-1 order, 44.94 minutes plus 7.6 minutes of travel time on every UCL-ND order and 128.9 minutes plus 20 minutes of travel time on every SL-2 order. A dispatch should only be required 5 % of the time for non-designed services such as SL-1's and a qualified technician should complete the necessary work in 25 minutes plus 20 minutes of travel time or 2.25 minutes per order. Designed loops should not take a skilled technician more than 40 to 50 minutes plus 20 minutes of travel time and be actually dispatched on 20 % of the orders. This equates to 10 minutes plus 4 minutes of travel time or 14 minutes on every on every order. These are reasonable and achievable assumptions for an efficient service provider with a forward looking network.

Q. CAN YOU ELABORATE ON THE SIGNIFICANCE OF THE DISPATCH RATE?

A. Yes. Internally, local exchange carriers typically measure their success in avoiding field dispatches via a performance measure referred to as the "NPV" rate (i.e., "no premises visit"). To operate efficiently, successful local exchange carriers normally operate at an NPV rate between 85% and 90% (which corresponds to a dispatch rate of 10% to 15%.). Improvements in outside plant engineering design and operating practices have been steadily decreasing the need for the actual dispatch of a technician.

Q. **WHAT ASSUMPTIONS DOES BELLSOUTH MAKE ABOUT COORDINATING DISPATCH ON SL-1 AND SL-2 LOOPS?**

A. As with xDSL orders, BellSouth has inappropriately assumed that the Work Management Center ("WMC") will be required to spend two minutes on every SL-1,SL-2 and UCL-ND loop order to "coordinate" dispatch of technicians. My analysis above of this work groups involvement in the xDSL cost study applies equally here.

Q. **HAVE YOU ALSO REVIEWED BELLSOUTH'S COST STUDY ASSUMPTIONS FOR CENTRAL OFFICE FORCES AND WORK TIME TO PROVISION SL-1, SL-2 AND UCL-ND LOOPS?**

A. Yes. I have also reviewed the task times BST has allocated for central office technicians to place the required cross connections and found them also inflated. BST has assumed that it will take a technician 15 minutes to wire the SL-1 UCL-ND Loop facilities to the CLECs collocation site on 85 % of the orders and 20 minutes to wire a SL-2 loop on 85% of the orders. A qualified technician should be able to complete this task in 5 to 8 minutes. If a design test point is placed on the loop, SL-2, then technicians should perform that work in less than 11 minutes.

Q. **HAVE YOU PREPARED A CHART TO COMPARE BELLSOUTH'S WORK TASK TIMES TO REASONABLE WORK TIMES TO PROVISION SL-1, UCL-ND AND SL-2 LOOPS?**

A. Yes the following chart provides a comparison of BellSouth's assumed work times and reasonable work times that an efficient service provider would incur to provision SL-1, UCL-ND and SL-2 loops.

Group or Function	BST Cost Study SL-1, SL-2 & UCL-ND	Realistic Time Assumption SL-1, SL-2 & UCL-ND Without any design process	Realistic Time Assumption SL-2 With Design Process
Group 1: Engineering	SAC 60 minutes on 10% of orders (6 min/order) AFIG 8 minutes on 30% of orders (2.4 min/order) PICS .31 min/SL-1 & SL-2 orders only CPG 4.95 minutes for SL-2 orders	SAC 10 minutes on 2% of orders (.2 min/order) AFIG 5 minutes on 2% of orders (.1 min/order)	SAC 10 minutes on 2% of orders (.2 min/order) AFIG 5 minutes on 2% of orders (.1 min/order) CPG 10 minutes on 2-5% of orders (.5 min/order)
Group 2: CONNECT & TEST (UNEC or CWINS)	27.84 minutes on every SL-1 & UCL-ND order 101.73 minutes on every SL-2 order	5 minutes on 2% of the loop orders (.1 min/order)	5 Minutes additional time for test at the MDF at time of installation
Group 3: CONNECT & TEST (WMC)	2 Minutes per loop	"2" Minutes on 5 % of the loop orders (.1 min/order)	"2" Minutes on 5 % of the loop orders (.1 min/order)
Group 4: CONNECT & TEST (CO I & M)	12.75 minutes on every SL-1 & UCL-ND order 17 minutes on every SL-2 order	8 Minutes on 100% of loops	11 Minutes on 100% of loops
Group 5: CONNECT & TEST (Installation)	48.98 minutes on every SL-1 order 44.94 minutes on every UCL-ND order 128.9 minutes on every SL-2 order 7.6 minutes travel for every SL-1 & UCL-ND order 20 minutes travel for every SL-2 order	25 Minutes on 5% of all orders, Plus 20 minutes of travel time (2.25 min/order)	50 Minutes total for 20% of loops (includes 5% additional error correction time) Plus 20 minutes of travel time (14 min/order)
Approximate Cost	107.88 min/SL-1 order 283.29 min/SL-2 order 103.53 min/UCL-ND order $75.84 per SL-1 $211.95 per SL-2 $72.80 per UCL-ND (pages 7 & 8, Caldwell testimony 4/25/01	10.75 minutes total per order $ 7.67 per loop without design process	30.9 minutes total per order $20.60 per SL-2 loop with design process

IV. HIGH CAPACITY LOOPS

Q. HAVE YOU REVIEWED BELLSOUTH'S NONRECURRING COST STUDIES FOR 4-WIRE DS-1 DIGITAL LOOPS?

A. Yes. I have reviewed this study. However, once again, BellSouth has not provided the necessary documentation to support the work times within their nonrecurring cost study for various organizations or groups that they deem necessary to provide 4W DS-1 digital loops. BellSouth's cost study for this loop includes more than 11 hours of work time involving more than a half dozen different work groups.

Q. WHAT WORK GROUPS ARE NECESSARY TO PROVISION THIS TYPE OF LOOP AND WHAT ARE REASONABLE WORK TIMES FOR COMPLETING THE WORK?

A. In a forward looking, efficiently managed network many of the work groups and their associated work times proposed by BST are unnecessary or overstated. Like other types of service orders, DS-1 orders should flow through the electronic databases, minimizing the need for manual intervention. After the order has been placed in the system by the business office or account representative, the necessary assignments should be electronically determined by the utilization of specific identifiers designated on each end of the circuit. Every existing central office, remote terminal, customer location with digital services, building utility service room, etc. is assigned a specific common language location identifier ("CLLI ") code or number which is unique to that location. If the location did not have a "CLLI" code, one would have to be established before the order could be processed. However most business locations where a DS-1 or DS-3 would be provisioned would have an existing CLLI code.

As the order proceeds electronically through the mechanized systems, LFACS and TIRKS would assign the necessary cable facilities, and equipment for the 4 Wire DS-1 loop. If for some reason, TIRKS was unable to complete the assignments, then the order could fallout and engineering would then be required to correct and input the necessary information into TIRKS. However, the majority of orders in a forward looking and properly managed database system should flow through without manual intervention. It would be reasonable to assume that maybe 2 in 10 or 20% of the orders may fallout in this electronic process, which is very conservative. Instead, BellSouth assumes huge amounts of engineering time on each order -- over 31/2 hours.

When fallout does occur and an engineer must be involved in the order, a competent engineer or in some cases an engineering clerical assistant should be able to correct the problem within 30 to 60minutes on average or 12 minutes on every 4 Wire DS1 Digital Loop. This engineering work time would include all engineering work tasks and encompass the CPG and PICS work groups.

The order should be dispatched electronically to the central office technician, SARTs or UNE center technician and field technician. The WMC should not be required 15 minutes on every order when dispatch should have been electronic. BellSouth does not explain why it takes 15 minutes on every loop to manually oversee a mechanized dispatch for DS-1 loops. Curiously, BellSouth assumes it will take 2 minutes of WMC time on every order Since this dispatch should be mechanized, it would be reasonable to assume that manual intervention would be necessary 5 % of the time and that should only require 2 minutes to correct or modify. This would equate to .1 minute on every order.

Any necessary wiring or programming should be accomplished by the CO technician in approximately 15 minutes or less. BellSouth has inappropriately assumed that it will take a qualified technician 25 minutes to complete this work and interestingly has included another 22.5 minutes of travel time with no explanation. If necessary for a CO technician to travel to an unstaffed office, that time would be in conjunction with other work and only occur on a limited number of orders. A reasonable travel allowance for CO work would be 20 minutes on 5% of the orders or 1 minute of additional time to each order.

BellSouth has assumed that it will be necessary for a field technician to spend nearly 4 hours (3.917 hours) to provision a 4-wire DS1 Digital Loop, which greatly overstates work time required to complete such an installation. A qualified field technician or installer would be able to complete a 4 Wire DS1 digital loop installation within 40 minutes and complete any testing if required with the SARTS or UNE center (ACAC in BST cost study) within 10 minutes. Since BellSouth has failed to provide any documentation or support to substantiate any of task times in their study, the Commission should reject BellSouth proposal and accept my recommendations as reasonable task times.

Q. PLEASE SUMMARIZE YOUR RECOMMENDED WORK TASK TIMES TO PROVISION A 4 WIRE DS1 DIGITAL LOOP?

A. The following table includes reasonable work times to provision a 4-wire DS1 digital loop in an efficiently managed forward looking network:

Rate Element: A.9 4-Wire DS1 Digital Loop		
Group or Function	BST Cost Study Assumptions 4 Wire DS1 Digital Loop	Recommended Work Time 4 Wire DS1 Digital Loop
Access Customer Advocate Center (ACAC)	137.5 minutes per order	5 minutes per order plus 20 minutes testing and closeout (total 25 min/order)
Outside Plant Engineering	180 minutes per order	12 minutes per order *includes AFIG, CPG & PICS work times
AFIG (engineering)	1 minute per order	* See OSP Eng
CPG (engineering)	37.5 minutes per order	* See OSP Eng
PICS (engineering)	2 minutes per order	* See OSP Eng
WMC	15 minutes per order	2 minutes on 5% of orders .1 minute per order
CO Installation	25 minutes per order plus 22.5 minutes of travel time per order	16 minutes per order includes 20 minutes travel on 5% of orders
Field Installation (SSIM)	235 minutes per order plus 18 minutes of travel time per order	40 minutes installation 10 minutes testing 20 minutes travel
Total Provisioning Time	673.5 minutes per order $506.05 per loop Caldwell Exhibit DDC-2 Revision 1	123.1 minutes per order $ 82.60 @ $40 per hour

Q. ARE BELLSOUTH'S DS-3 LOCAL CHANNEL AND LOOP NONRECURRING COST STUDIES LIKEWISE FLAWED

A. Yes. BellSouth's cost study for provisioning the DS-3 local channel and DS-3 loop are the same. Both include many overstated work times and work groups that I do not believe should be involved in provisioning DS-3s. Again, BellSouth does not provide any support or documentation as to what each work group is doing and that makes me question the cost study.

For example, the engineering, central office installation and field installation work times seem quite excessive. DS-3's are provisioned over fiber facilities with the necessary multiplexing and other equipment on each end. BellSouth's study seems to assume the type of task times that might be necessary if BellSouth were actually deploying the fiber each time a CLEC ordered a DS-3. What BellSouth should have studied was the reasonable tasks time and work groups necessary to put the existing fiber system into service.

Without any support whatsoever, BellSouth assumes that the Complex Resale Support Group (CRSG) will spend 2 hours on each DS-3 order. Additionally, BellSouth assumes that the Network & Engineering Planning group will spend another 2.24 hours on each order. These tasks are both unsupported and unnecessary. In a forward looking network, the CLEC order for DS-3s should flow through the system without 2 hours of processing time. Moreover, the Network Planning group is not necessary to provide DS-3s.

As the order moves through BellSouth's systems, BellSouth assumes that the Circuit Provision Group will need 1.6 hours for each order, while the engineering group will need over 2 hours for each order. DS-3 circuits should be provisioned by an electronic system that readily assigns available fiber to the order if necessary. It is very possible that a DS-3 order would be assigned to an existing OC-3 or higher optical transmission system that is in service and has spare DS-3 capacity for order assignment. The only engineering work necessary would be when it was necessary to add DS-3 capacity to an existing optical transmission system. In that case, engineers would order additional "high speed" cards for each end of the transmission system. This should take no more than 15 to 20 minutes on maybe 50% of the orders or 10 minutes on every order. The total engineering, including PICS and CPG work time should not exceed 60 minutes for the average DS-3 order. When no capacity exists for the order, BellSouth would then need to involve network engineering and create and execute a capacity relief job. However, those costs would be fully recovered in recurring costs which include the cost of laying the fiber or augmenting electronics and setting up the network. The nonrecurring charges should only reflect work necessary to put existing facilities into service.

BellSouth's nonrecurring charges are inherently flawed and the Commission should not approve the proposed rates for these elements.

Q. PLEASE PROVIDE REASONABLE TASK TIMES FOR PROVISIONING DS-3 LOCAL CHANNEL AND LOOP FACILITIES.

A. The table below provides a comparison of realistic work times with the inflated assumptions BellSouth has included.

Rate Elements: D.5.7 & D.5.8 DS3 Local Channel A.16.1 & A.16.2 DS3 Local Loop		
Group or Function	BST Cost Study Assumptions DS3 Local Channel & DS3 Local Loop	Recommended Work Time DS3 Local Channel & DS3 Local Loop
CRSG	120 minutes per order	20 minutes per order
Engineering	260 minutes per order	60 minutes per order *includes CPG & PICS work times
CPG (engineering)	106.5 minutes per order	* See Engineering
PICS (engineering)	2 minutes per order	* See Engineering
WMC	15 minutes per order	2 minutes on 5% of orders .1 minute per order
UNEC	117.6 minutes per order	20 minutes per order
CO Installation	231.8 minutes per order	60 minutes per order
Field Installation (SSIM)	291 minutes per order plus 18 minutes of travel time per order	50 minutes installation 20 minutes testing 20 minutes travel
Total Provisioning Time	1143.9 minutes per order $905.04 per loop Caldwell Exhibit DDC-2 Revision 1	250.1 minutes per order $166.73 @ $40 per hour

Q. DOES BELLSOUTH'S COST STUDY PROVIDE ANY SUPPORT FOR THEIR NONRECURRING LABOR CHARGES TO PROVISION OC-3, OC-12 OR OC-48 FACILITIES?

A. BellSouth provides no support for the labor assumptions to provision OC-3, OC-12 and OC-48 optical facilities. The task times are extremely inflated and should be rejected by this commission until BellSouth provides some support for the times that it has assumed. All task times exceed reasonable assumptions, especially Service Inquiry and Engineering. I have personally engineered, constructed and tested these optical facilities and cannot understand why BST is assuming it would take 14 hours in the Service Inquiry process. There is simply no foundation for their assumptions for these elements.

Q. WHAT ARE MORE REALISTIC WORK TIMES?

A. I have included a table below with my recommendations.

Rate Elements: A.16.4 & A.16.5, A.16.7 & A.16.8, A.6.10,A.6.11 & A.6.13 OC-3 Local Loop, OC-12 Local Loop & OC-48 Local Loop			
Group or Function	BST Cost Study Assumptions OC-3 Local Loop	BST Cost Study Assumptions OC-12 & OC-48 Local Loop	Recommended Work Time OC-3, OC12, & OC-48 Local Loop
CRSG	120 minutes per order	120 minutes per order	20 minutes per order
Engineering	605 minutes per order	845 minutes per order	40 minutes per order
CPG (engineering)	106.5 minutes per order	106.5 minutes per order	20 minutes per order
PICS (engineering)	2 minutes per order	2 minutes per order	2 minutes per order
WMC	15 minutes per order	15 minutes per order	2 minutes on 5% of orders .1 minute per order
UNEC	117.6 minutes per order	117.6 minutes per order	15 minutes per order
CO Installation	231.8 minutes per order	231.8 minutes per order	60 minutes per order
Total Provisioning Time	1197.9 minutes per order $968.26 per loop Caldwell Exhibit DDC-2 Revision 1	1437.9 minutes per order $1186 per loop Caldwell Exhibit DDC-2 Revision 1	157.1 minutes per order $104.73 @$40/hour

Q. **ARE BELLSOUTH'S ASSUMPTIONS AND TASK TIMES REASONABLE FOR THE PROVISIONING OF ISDN/UDC LOOPS?**

A. No. BellSouth has assumed exceptionally high fallout probabilities for these elements. In the SAC process they have assumed that 67 % of the orders will require manual intervention which results in each order incurring 40.2 minutes of task time. These type of orders may require a little more manual intervention, but certainly not 2 of 3 orders failing in the electronic process. It would more reasonable to assume that 10% with an engineering task time of 20 minutes on average to correct and 5 minutes to log in and out or a total 2.5 minutes on every order.

Likewise the AFIG task time and fallout probability is overstated. Assigning these facilities should be no different than other facilities and it would be reasonable to assume fallout of 2% with a 5 minute task time to correct or .1 minutes per order. The CPG should only require 10 minutes to correct the mechanized system on 2-5 % of the orders, not 15 and 18 minutes on 15% of the orders as BST has assumed. It would be reasonable to assume that this process will add .5 minutes to every order.

Q. **ARE THE UNE CENTER TASK TIMES REASONABLE IN BST'S ISDN/UDC COST STUDY?**

B. Absolutely not. They are overstated as well. The UNEC task time for provisioning these elements should be similar to xDSL compatible loops and UNEC time should not exceed 5 minutes per loop on average. BellSouth has failed to realize the capabilities and efficiencies of available test sets like the 965 DSP-SA test set that I referenced earlier in my testimony.

Q. ARE BELLSOUTH'S SSI&M (INSTALLATION) ASSUMPTIONS ALSO FLAWED?

A. Yes. It certainly does not take a qualified technician 128.9 minutes plus 20 travel time to provision an ISDN/UDC loop. This task should not exceed 30 minutes plus travel time on average. BellSouth's assumptions that 30 % of the loops will have troubles at the cross box and that it will take a qualified technician 45 minutes to resolve is unjustified. Likewise their "trouble resolution at premise" with a task time of 56 minutes on 21 % of the order is also very unreasonable. BellSouth's actual plant facilities are in much better condition than their non-recurring cost studies indicate. Their assumptions contradict how an efficient, forward looking network would function.

V. LOOP CONDITIONING

Q. SHOULD LOAD COILS EXIST ON COPPER LOOPS THAT ARE LESS THAN 18,000 FEET IN LENGTH?

A. No. Load coils on plain old telephone service ("POTS") loops were appropriate, when copper loop lengths exceeded 18,000 feet. However, according to engineering design rules that have been in place for more than 20 years, loops over 18,000 feet should be provisioned on Digital Loop Carrier systems, so that load coils are never required. Any working POTS loop less than 18,000 feet should have load coils removed to provide good quality service. The presence of these devices on loops less than 18,000 feet are detrimental to both POTS and digital data services.

Q. DO BELLSOUTH'S INTERNAL GUIDELINES SPECIFY THAT LOAD COILS SHOULD BE REMOVED FROM THE EXISTING COPPER FEEDER FACILITIES WHEN IT IS REPLACED BY FIBER FED DLC?

A. Yes. Page 33 of

Q. PLEASE DESCRIBE WHAT BRIDGED TAP IS?

A. Bridged tap is any section of a cable pair not on the direct electrical path between the central office and end user. This condition increases the electrical loss on the pair. It occurs when a cable pair has a three-way splice (from the central office to location #1 to location #2), such that dial tone can appear in two or more different cable pair locations.

Q. SHOULD BRIDGED TAP APPEAR IN COPPER FEEDER PLANT?

A. No. The use of bridged tap is inconsistent with modern engineering guidelines which have been in use since 1972.

Q. SHOULD BRIDGED TAP BE USED IN DISTRIBUTION PLANT?

A. Although a backbone distribution cable may contain many cable pairs, once distribution spans out into side legs, the same cable pair should never appear in two different side legs. Distribution cable should always be engineered in 25-pair binder groups, such that no pairs in a particular 25-pair binder group should ever appear in more than one side leg. This ensures no bridged tap conditions between separate distribution side legs.

Q. WITNESS CALDWELL STATES THAT BELLSOUTH'S COST STUDY USES COSTS THAT ARE FORWARD-LOOKING AND REFLECT AN EFFICIENT NETWORK DESIGN. PLEASE COMMENT.

A. Contrary to Ms. Caldwell's statement the assumptions and costs used in BellSouth's cost studies does not represent a "forward-looking" efficient network design. Although Mr. Milner describes what would be a forward-looking efficient network design in his testimony, BellSouth's cost study nevertheless differs from that methodology.

Q. WOULD YOU PLEASE EXPLAIN?

A. Yes. A forward-looking network would comply with the engineering guidelines that have evolved over the decades. In a forward-looking efficiently designed network, loops greater than 18,000 feet would be provisioned over fiber fed digital loop carrier and all loops would be capable of provisioning advanced services. Therefore, the requirement to place load coils or repeaters on long loops is eliminated and excessive bridge taps would not exist if BellSouth had adhered to those guidelines.

For example, BellSouth's cost studies have inappropriately assumed a network that includes:

- load coils on an excessive number of loops, even those loops that are less than 18,000 feet from the central office
- loops less than 18,000 feet contain 2.1 load coils
- loops greater than 18,000 feet contain 3.15 load coils of which 90% are located in the underground and only 10% are located in aerial or buried plant
- Sub loops (distribution plant) contain 1.2 load coils and 10% of those load coils are in underground plant
- excessive bridge tap exists at 3 points on a loop and that even one of those bridge taps is in the underground feeder facilities

Q. PLEASE DESCRIBE HOW COPPER CABLES ARE CONSTRUCTED AND METHODS USED BY TECHNICIANS TO SPLICE CABLES.

A. Since the late 1960's, copper cables installed in the modern loop network primarily have been plastic insulated copper conductor cable or "PIC" cable. Plastic insulated conductor cable is designed for ease in cable pair identification. It is made up of 25 pair, color-coded binder groups and is available in cable sizes up to 4200 pair. Approximately 30 years ago, modular copper cable splicing was introduced into the industry and remains the standard method of connecting or splicing the network. With modular splicing, technicians can splice and rearrange cable facilities very efficiently by the use of 25 pair splicing modules. These splicing operations would also be applicable when load coils, bridge taps and repeaters would need to be removed for loop conditioning. If permitted, I can provide a brief demonstration of this splicing activity during the summary of my testimony.

Q. BELLSOUTH'S COST STUDIES ASSUME THAT ONLY 10 LOAD COILS WILL BE REMOVED WHEN LOAD COILS ARE REMOVED FOR LOOP CONDITIONING. IS THAT A REASONABLE ASSUMPTION?

A. Not at all. First as I mentioned above, BellSouth should not be entitled to charge for the removal of load coils on loops less than 18,000 feet, so BellSouth's costs for loop conditioning – short should be dismissed by this Commission. BellSouth's assumption that only 10 pairs would be unloaded at a time is totally unrealistic and contradictory to industry accepted splicing techniques. If unloading were necessary and if the Commission determined that BellSouth should recover for this work, that work most efficiently would be performed in increments of at least 50 pairs, two binder groups.

Any experienced technician or OSP engineer understands and will stress the importance of maintaining binder group integrity and acknowledges that 25 pair binder groups are the very foundation of the copper network. On average, technicians should be able to condition at least 50 pair at a time.

Q. DO BELLSOUTH'S ENGINEERING PRACTICES OR GUIDELINE ADDRESS LOOP CONDITIONING?

Yes. BellSouth's

Q. ARE THERE OTHER ADVANTAGES TO CONDITIONING AT LEAST 50 PAIRS PER TECHNICIAN VISIT?

A. Yes, there are. Each time a technician opens a splice case in the outside plant network for purposes of loading or deloading cable pairs (regardless of the number of pairs loaded or deloaded), the process of opening, manipulating and closing the splice case can result in significant wear and tear not only on the apparatus itself, but on the contents as well. Deloading 50 pairs per technician visit would significantly reduce the number of times a technician would need to open/close any particular splice case within the network thereby minimizing the negative impacts of this type of work on the network.

Q. **BELLSOUTH WITNESS GREER ON PAGE 12 LINES 25-26 OF HIS FEBRUARY 16, 2001 TESTIMONY INDICATED THAT "OUTSIDE PLANT ENGINEERING PRACTICES ALLOW FOR A LOOP LESS THAN 18,000 FEET IN LENGTH TO HAVE AS MANY AS 3 LOAD POINTS. ARE YOU AWARE OF ANY ENGINEERING PRACTICE THAT INDICATES LOOPS LESS THAN 18,000 FEET SHOULD BE LOADED?**

A. No. I do not know of any engineering practice that indicates that loops less than 18,000 feet should be loaded. At one time it was necessary to load pairs used for analog PBX facilities, however those only involved a very, very small number of pairs and those systems have been replaced several years ago. If Mr. Greer knows of an engineering practice that indicates cable pairs less than 18,000 should be loaded, he should produce that practice. In over 30 years as an Outside Plant Engineer, I have never see such a practice.

Q. **BELLSOUTH'S COST STUDIES ASSUME THAT LARGE PERCENTAGES OF LOOP CONDITIONING JOBS WILL BE PERFORMED IN AN UNDERGROUND (MANHHOLE) ENVIRONMENT. IS THAT A REASONABLE ASSUMPTION?**

A. No. First, underground structures generally exist near the central office and houses the largest number of cable facilities in terms of cable pairs. These underground environments are located in the dense metropolitan areas where loop length is short. Thus, the loops are less likely to have required loading. Secondly, in a typical network, the largest percentage of customers will reside within 18,000 feet (3.4 miles) of the central offices and loading is not required on those loops. Third, since the cable pair sizes are typically much larger in the underground segment of the local network, larger capacity load coil cases were placed prior to the implementation of digital loop carrier as the preferred choice for feeder facilities. While some of these load coil cases may still be in underground plant the vast majority of the load coils within the cases will not be attached to cable pairs. For example, assume a 900 pair load coil case, (LCC) was placed in a manhole and spliced into a 2700 pair cable. When initially installed maybe all 900 load coils were spliced to cable pairs. At that point the LCC count may have been:

824 LCC w/900 662 coils

Cable 1, 1-900

This count indicates that all load coils within the LCC are connected or spliced to cable pairs.

However as the network was modernized and fiber fed digital loop carrier systems replaced the copper feeder facilities and majority of the copper feeder facilities would be re-engineered to serve distribution areas close to the central office. Such re-engineering would trigger load coils removal. At that point, the LCC count may have changed to:

824 LCC w/900 662 coils

Cable 1, 1 – 50

850 coils dead

This count indicates that 850 load coils within the LCC are not connected or spliced to cable pairs. Therefore, while a 900 pair load coil exists in the ILECs records, only 5.6 % of the load coils are actually connected to cable pairs in this example

Q. WHAT PERCENTAGE OF LOAD COIL REMOVALS DOES BELLSOUTH'S COST STUDY ASSUME WILL BE IN THE UNDERGROUND?

A. BellSouth's cost study assumes a staggering 90% of load coil removals will be in the underground and 10% in either aerial or buried plant.

Q. WHAT PERCENTAGE OF BRIDGED TAP REMOVAL DOES BELLSOUTH'S COST STUDY ASSUME WILL BE IN THE UNDERGROUND?

A. BellSouth's cost study assumes that 33% of loops requiring bridged tap removal will be in the underground and the remaining 67% will be either in aerial or buried plant.

Q. DOES BELLSOUTH REPORT THE AMOUNT OF CABLE PLANT FOR EACH STRUCTURE TYPE BY DISTANCE?

A. Yes. BellSouth and other ILECs report the amount of cable plant by structure type and length yearly to the FCC.

Q. WHAT PERCENTAGE OF UNDERGROUND COPPER CABLE PLANT WAS REPORTED BY BELLSOUTH?

A. The following table shows the length of copper cable facilities reported to the FCC by BellSouth the State of South Carolina. This indicates that only 5.6 % (by distance) of BellSouth's copper cable facilities are placed within underground structure and that the percentage of underground copper cable for BellSouth is trending downward as fiber fed digital loop carrier is deployed to provide feeder facilities. This shows the flaw in BellSouth's assumptions about how many load points will be found in underground environments since loading is determined by length. Because the underground environment is the most time consuming (and costly) to work in, BellSouth's erroneous assumption unnecessarily increases costs.

Outside Plant Statistics-Cable and Wire Facilities -ARMIS Data Table 43-08										
Source - www.fcc.gov/ccb/armis/welcome.html										
Copper Cable Plant										
Year	Company	State	Aer Sheath Km Metallic	Aer % of Total	UG Sheath Km Metallic	UG % of Total	Bur Sheath Km Metallic	Bur % of Total	Total Aer, Bur & UG Cable Km Metallic	Total Conduit Sys Trench Km
1996	Bell South	S. Carolina	11218	15.7	4129	5.7	56276	78.6	71623	2202
1997	Bell South	S. Carolina	11276	15.6	3629	5.0	57563	79.4	72468	2224
1998	Bell South	S. Carolina	11072	15.1	4179	5.7	57917	79.2	73168	2234
1999	Bell South	S. Carolina	11090	15.0	4199	5.6	58807	79.4	74096	2268
2000	Bell South	S. Carolina	11104	14.8	4187	5.6	59712	79.6	75003	2292
Fiber Cable Plant										
			Aer Sheath Km Fiber	Aer % of Total	UG Sheath Km Fiber	UG % of Total	Bur Sheath Km fiber	Bur % of Total	Total Aer, Bur & UG Cable Km Fiber	Total Conduit Sys Trench Km
1996	Bell South	S. Carolina	201	2.7	2250	30.5	4923	66.8	7374	2202
1997	Bell South	S. Carolina	241	3.1	2393	30.6	5198	66.3	7832	2224
1998	Bell South	S. Carolina	280	3.3	2602	30.9	5544	65.8	8426	2234
1999	Bell South	S. Carolina	333	3.7	2744	30.5	5924	65.8	9001	2268
2000	Bell South	S. Carolina	370	3.9	2892	30.2	6310	65.9	9572	2292
Fiber Plant Utilization										

Year	Company	State	Total Km Fiber Deployed	Total Km Fiber Lit	% Lit
1996	Bell South	S. Carolina	203005	47556	23.4
1997	Bell South	S. Carolina	227911	85322	37.4
1998	Bell South	S. Carolina	261374	79909	30.6
1999	Bell South	S. Carolina	287259	66133	23.0
2000	Bell South	S. Carolina	325611	74512	22.9

Q. PLEASE EXPLAIN HOW THE ABOVE CHART RELATES TO BELLSOUTH'S LOOP CONDITIONING ASSUMPTIONS.

A. The placement of load coils is determined by the length of the copper cable facility and are required for voice transmission after the loop length exceeds 18,000 feet. In BST's cost study they have assumed that 90 % of the loads that need to be removed are in the more costly underground environment. This chart indicates that by length, which is the criteria for loading, only 5.6 % of BellSouth's copper plant in South Carolina is in the underground. This report indicates that the largest percentage by length of BellSouth's copper plant is actually in the less costly buried environment. Hence it should be assumed that only 5.6 % of the unloading should take place in the underground, certainly not 90% as BellSouth would like this commission to believe.

Q. WHEN BELLSOUTH DEPLOYS FIBER FED DIGITAL LOOP CARRIER ("DLC") SYSTEMS TO REPLACE COPPER FEEDER FACILITIES SHOULD LOAD COILS BE REMOVED

Yes. Any load coils on loops within 18,000 feet of the central office or remote terminals should be removed to ensure that loading rules are not violated and engineering guidelines are followed. BellSouth's Loop Technology Deployment

Directives also address the unloading of existing copper facilities that have been replaced with fiber fed DLC as I mentioned earlier in my testimony.

Q. **SHOULD THE COMMISSION ACCEPT BELLSOUTH'S ASSUMPTION THAT LOOPS LESS THAN 18,000 FEET WILL HAVE 2.1 LOAD COILS?**

A. No. This assumption and associated costs within BellSouth's cost studies is not supportable. ILECs should not be entitled to charge CLECs to correct the designs errors in their networks. Several other ILECs and Commissions have recognized that it would be improper to require CLECs to pay for the removal of load coils since these coils should have been removed over the past 20–30 years. Moreover, BellSouth has shown no evidence that this assumption is supported by its actual outside plant. During his deposition, BST witness William Greer, indicated that BST utilized the number of load coils in its records and then assumed so many were in the various plant types. This would be a very erroneous method to determine the number of pairs with load coils and where those load coils are located in the network. While plant records would indicate the number of load coils in the network, those records do not indicated the actual or even approximate number that are connected to cable pairs. Large numbers of loads coils are actually dead or not connected in most existing networks, if present at all.

Q. **BELLSOUTH'S COST STUDY ALSO ASSUMES THAT LOOPS GREATER THAN 18,000 FEET WILL HAVE 3.15 LOADS PER LOOP. IS THIS ASSUMPTION CONSISTENT WITH A FORWARD-LOOKING NETWORK?**

A. Most definitely not. Under BellSouth's cost study assumption of 3.15 load coils, these loops would range between 21,000 feet to 30,000 feet on average if the minimum (3000 feet) and maximum (12,000 feet) end section loading rules are applied. Much different than the network infrastructure design that BellSouth witness Milner describes in his testimony and I have also discussed earlier. Consequently, forward-looking network design calls for the use of fiber-fed DLC systems before loops can become long enough to require load coils.

Q. WHAT DO MODERN ENGINEERING GUIDELINES SAY ABOUT THE USE OF LOAD COILS AND BRIDGED TAP?

A. Carrier Serving Area guidelines clearly state:

> "The maximum allowable bridged-tap is 2.5 kft, with no single bridged-tap longer than 2.0 kft. All CSA loops must be unloaded."[1]

These guidelines have been in effect for more than 20 years.

Q. GIVEN THIS LENGTH OF TIME, HOW OFTEN SHOULD IT BE NECESSARY TO REMOVE LOAD COILS AND BRIDGED TAP?

A. Not very often. Since these guidelines would have made load coil and excessive bridged tap conditions obsolete over the past 20 to 30 years, almost all outside plant designed prior to that is near or well past its plant life and should have been replaced by now. Any instances of excessive bridge tap should be very limited or non-existent. Bellcore's "BOC Notes on the LEC Networks-1994", Issue 2, April 1994, indicates that bridged tap on the average loop had already been reduced to 1,490 feet in 1983 and 98 % of the loops were ISDN DSL capable.

[1] Telcordia Notes on the Networks, Issue 4, October 2000 Section 12.1.4 .

Q. PLEASE SUMMARIZE WHY A $0.00 NON-RECURRING CHARGE FOR LOOP CONDITIONING IS THE APPROPRIATE FORWARD-LOOKING PRICE?

A. Loop conditioning generally involves removing devices that were put in place in accordance with embedded plant design guidelines that are long outdated. The network engineering guidelines in place for the past two decades call for a loop architecture that does not deploy load coils, excessive bridged taps or repeaters that inhibit the provision of advanced services such as ISDN and DSL-based services. The types of activities that BellSouth has assumed for conditioning are DSL-capable loops only exist if one assumes a network design incorporating excessive bridged taps and load coils that BellSouth must remove to make certain loops DSL-capable. That network design is fundamentally incompatible with the least-cost, most efficient technology assumptions of a forward-looking economic cost study.[2]

Costs must be based on a forward-looking network and not on a spectrum of possible networks from which the incumbent ILEC chooses the option that produces the highest cost for each specific occasion. More specifically, this Commission should not allow BellSouth to assume, for example, that its network will both have load coils and not have load coils when developing charges to impose on competitors.

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[2] The TELRIC methodology assumes "the most efficient telecommunications technology currently available and the lowest cost network configuration." Also, to comply with the FCC TELRIC methodology, a cost study may not consider costs "incurred in the past and that are recorded in the incumbent LEC's books of accounts." 47 C.F.R. §§ 51.505(b)(1) and (d).

Q. WHAT NON-RECURRING CHARGES HAS BELLSOUTH PROPOSED FOR REMOVAL OF BRIDGED TAPS AND LOAD COILS IN SOUTH CAROLINA?

A. The following rates for the removal of load coils and bridged taps have been proposed by BellSouth in South Carolina:

ULM	Load Coil/Equipment Removal – short	$ 64.91
ULM	Load Coil/Equipment Removal – long	$341.77
ULM –	Bridge Tap Removal	$ 64.95
U sub-loop M	2w/4w Dist Load Coil Rm additional $ 10.21	$352.34
U sub-loop M	2w/4w Dist Bridge Tap Removal additional $ 12.25	$557.64

Q. IF THIS COMMISSION DECIDES TO PERMIT THE ILECS TO CHARGE FOR LOAD COIL REMOVALS ON LOOPS LONGER THAN 18,000 FEET, WHAT CHARGES WOULD BE APPROPRIATE?

A. Just as for shorter loops, if BellSouth had follow proper outside plant engineering guidelines, then loops over 18,000 would either not exist or would be fed by fiber. Therefore, they would not require and should not have load coils. The correct forward-looking cost for removing them is therefore zero. However, if this Commission nevertheless decides to permit the ILECs to impose such charges then those charges should be based on efficient, least-cost practices generally employed in the telecommunications industry, which will be described below.

While a forward-looking network design results in zero conditioning charges, I describe below the efficient tasks and task times for a conditioning job, in the event that this Commission insists on ordering conditioning charges. The tasks and work times are based on my personal experience and the experience of others familiar with performing such operations, and in supervising others who performed such operations. In addition, I am prepared to perform the splicing operations before this Commission to demonstrate the reasonableness of these time estimates. These times are readily achievable, and the resulting rates are reasonable.

Q. IF LOAD COILS MUST BE REMOVED, HOW MANY LOCATIONS ARE NORMALLY INVOLVED?

A. Once load coils are deployed, starting only when a copper loop reaches 18,000 feet in length, loads are immediately deployed in 6,000 foot increments, starting with two or three locations (at 3,000 feet, 9,000 feet, and at 15,000 feet) with a minimum of two load points. Also, since feeder cable is normally placed in conduit when close to the central office, I have conservatively assumed that on average 1.5 load coil locations involve underground cable at manhole locations. However it has been my experience that in a large number of locations feeder cables are either on pole line structure or buried within a mile and half of the office. The remaining load coil locations (1.5) will most likely be in aerial or buried locations. Therefore, I have assumed that 75 percent of the time deloading at these locations will be at an aerial location, and 75 percent of the time at a buried location. It is my opinion that the following work steps and conservative time estimates can be used by this Commission to estimate the costs involved in removing load coils from these three locations:

Underground Cable Load Coil Removal in a Manhole		
Step	Description	Task (min.)
1	Travel time to underground splice location.	20
2	Set up work area protection and underground work site.	5
3	Pump and ventilate manhole.	15
4	Buffer cable / Rerack cable / set up splice.	5
5	Open splice case.	5
6	Identify pairs to be deloaded for 1st 25-pair binder group.	5
7	Bridge 25-pair binder group for service continuity (if necessary).	5
8	Remove / sever connection from main cable to load 'in' & 'out taps.	3
9	Rejoin / splice 25-pair binder group through main cable.	5
10	Remove bridging modules from Step 7.	2
11	Identify pairs to be deloaded for 2nd 25-pair binder group.	5
12	Bridge 25-pair binder group for service continuity (if necessary).	5
13	Remove / sever connection from main cable to load 'in' & 'out' taps.	3
14	Rejoin / splice 25-pair binder group through main cable.	5
15	Remove bridging modules from Step 12.	2
16	Clean, reseal, and close splice case.	10
17	Rack cables, pressure test cables in manhole.	10
18	Close down manhole, stow tools, break down work area protection.	10
	Total Minutes	120
	Total Hours	2.00
	No. Technicians	2
	Total Timesheet Hours	4.00
	No. Locations	1.5
	Total Hours	6
	Pairs deloaded	50
	Minutes per pair	7.2 min.

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Aerial Cable Load Coil Removal at a Pole (50% occurrence)		
Step	Description	Task (min.)
1	Travel time to aerial splice location from underground splice location.	10
2	Set up work area protection.	5
3	Set up ladder or bucket truck.	10
4	Open splice case.	5
5	Identify PIC pairs to be deloaded for 1st 25-pair binder group.	2
6	Bridge 25-pair binder group for service continuity (if necessary).	5
7	Remove / sever connection from main cable to load 'in' & 'out taps.	3
8	Rejoin / splice 25-pair binder group through main cable.	5
9	Remove bridging modules from Step 6.	2
10	Identify pairs to be deloaded for 2nd 25-pair binder group.	2
11	Bridge 25-pair binder group for service continuity (if necessary).	5
12	Remove / sever connection from main cable to load 'in' & 'out taps.	3
13	Rejoin / splice 25-pair binder group through main cable.	5
14	Remove bridging modules from Step 11.	2
15	Clean, reseal, and close splice case.	10
16	Secure splice case to strand and clean up work area.	10
17	Close down aerial site, stow tools, break down work area protection.	10
	Total Minutes	94
	Total Hours	1.57
	No. Technicians	1
	Total Timesheet Hours	1.57
	No. Locations	0.75
	Total Hours	1.18
	Pairs deloaded	50
	Minutes per pair	1.42 min.

Buried Cable Load Coil Removal at a Pedestal (50% occurrence)		
Step	Description	Task (min.)
1	Travel time to buried splice location from underground splice location.	10
2	Set up traffic cone at rear bumper of truck.	1
3	Walk to site & open splice pedestal.	2
5	Identify PIC pairs to be deloaded for 1st 25-pair binder group.	2
6	Bridge 25-pair binder group for service continuity (if necessary).	5
7	Remove / sever connection from main cable to load 'in' & 'out taps.	3
8	Rejoin / splice 25-pair binder group through main cable.	5
9	Remove bridging modules from Step 6.	2
10	Identify pairs to be deloaded for 2nd 25-pair binder group.	2
11	Bridge 25-pair binder group for service continuity (if necessary).	5
12	Remove / sever connection from main cable to load 'in' & 'out taps.	3
13	Rejoin / splice 25-pair binder group through main cable.	5
14	Remove bridging modules from Step 11.	2
16	Secure splice within buried pedestal and clean up work area.	3
17	Close down buried site, stow tools and traffic cone.	5
	Total Minutes	55
	Total Hours	0.92
	No. Technicians	1
	Total Timesheet Hours	0.92
	No. Locations	0.75
	Total Hours	0.69
	Pairs deloaded	50
	Minutes per pair	0.83 min.

Q. **IF THIS COMMISSION DECIDES TO PERMIT THE ILECS TO CHARGE FOR BRIDGED TAP REMOVAL, WHAT CHARGES WOULD BE APPROPRIATE?**

A. Although this Commission should not elect to allow the ILECs to charge for loop conditioning, any charges imposed must be based on efficient, least-cost practices generally used in the telecommunications industry. Presented below are reasonable tasks and task times associated with removing a bridged tap. The tasks and work-times are based on my personal experience and others who are experienced in performing such operations and in supervising others who performed such operations. The task times I am proposing are readily achievable and the resulting rates are reasonable.

Q. BELLSOUTH WITNESS GREER HAS TESTIFIED THAT "BRIDGED TAP IS THE TOOL THAT ENGINEERS CAN USE TO PROVIDE FLEXIBILITY IN THE NETWORK." (GREER TESTIMONY PAGE 11.) PLEASE COMMENT ON HIS STATEMENT.

A. Bridged tap, especially excessive bridged tap was engineered out of the outside plant network with the introduction of the Serving Area Concept in the early 70's. With the placement of serving area interfaces or cross-boxes, engineers achieve flexibility in the network without utilizing multiple or bridged plant. A forward looking designed network would only have minimal bridged plant conditions and that would mostly be "end section" or cable extending beyond to customer location. The plant design that Mr. Greer implies has been eliminated several years ago.

Q. IF BRIDGED TAPS MUST BE REMOVED, WHERE IN THE NETWORK ARE THEY MOST LIKELY TO BE REMOVED, AND HOW MANY LOCATIONS ARE NORMALLY INVOLVED?

A. As explained previously, bridged taps should have been eliminated almost 30 years ago, except for limited end section bridged taps that could be removed in the service terminal at time of an installation visit. In addition, bridged tap should not exist in underground feeder cable close to the central office. Therefore, I have assumed that a single case of bridged tap, if it occurs, would occur 50 percent of the time at an aerial location, and 50 percent of the time at a buried location.

Accordingly, it is my opinion that the following work steps and conservative time estimates can be used by this Commission to estimate the costs involved:

	Aerial Cable Bridged Tap Removal from Distribution at a Pole (50% occurrence)	
Step	Description	Task (min.)
1	Travel time to aerial splice location	20
2	Set up work area protection	5
3	Set up ladder or bucket truck	10
4	Open splice case	5
5	Identify PIC pairs for bridged tap removal	2
6	Remove bridging modules or cut & clear pairs	2
7	Clean, reseal, and close splice case	10
8	Secure splice case to strand and clean up work area	10
9	Close down aerial site, stow tools, break down work area protection	10
	Total Minutes	74
	Total Hours	1.23
	No. Technicians	1
	Total Timesheet Hours	1.23
	No. Locations	0.5
	Total Hours	0.62
	Pairs Unbridged	25
	Weighted Average Minutes per pair	1.48 min
	Buried Cable Bridged Tap Removal from Distribution at a Pedestal (50% occurrence)	
Step	Description	Task (min.)
1	Travel time to buried splice location	20
2	Set up traffic cone at rear bumper of truck	1
3	Walk to site & open splice pedestal	2
4	Identify PIC pairs for bridged tap removal	2
5	Remove bridging modules or cut & clear pairs	2
6	Secure splice within buried pedestal and clean up work area	3
7	Close down buried site, stow tools and traffic cone	5
	Total Minutes	35
	Total Hours	0.58
	No. Technicians	1
	Total Timesheet Hours	0.58
	No. Locations	0.5
	Total Hours	0.29
	Pairs Unbridged	25
	Weighted Average Minutes per pair	0.70 min.

Q. ARE THERE OTHER WORK TIMES FOR LOOP CONDITIONING THAT HAVE BEEN OVERSTATED BY BELLSOUTH.

A. Yes, BellSouth has grossly overstated the amount of engineering time that would be required for loop conditioning, to the point of being ridiculous. BellSouth's study assumes 225 minutes or 3¾ hours of engineering time, plus an additional 20 minutes of clerical time and 60 minutes (1hr) for records posting. The engineering associated with either load coil or bridged tap removal is one of least labor intensive jobs an engineer performs. Since the location of load coils or splice points where bridged taps may exist are already indicated in the existing plant records within the engineering office, there should be no fieldwork required for 99 percent of the cases. Even if the engineer does not have access to a mechanized plant record system like CAD and he has to look at paper plats or charts, the necessary information is still readily available. The actual engineering of the work print or design is extremely easy to perform as well. Likewise, posting and updating plant records does not consume much time.

As an engineer with over 30 years experience who has literally issued hundreds of work prints and supervised others who have also performed this work function, I cannot imagine any engineering organization or department tolerating such inefficiencies. The engineering time assumed for loop conditioning in BellSouth's cost study overstates what a trained and efficient engineering organization would require performing the necessary tasks.

Q. WHAT IN YOUR OPINION WOULD BE A REASONABLE WORK TIME FOR ENGINEERING TO COMPLETE THE NECESSARY WORK FOR LOOP CONDITIONING?

A. I would recommend to this Commission that 90 minutes or 1½ hours as a reasonable time to perform the necessary engineering functions associated with loop conditioning. This is a very conservative estimate and in efficient engineering organizations will complete the necessary engineering work in substantially less time.

Q. DOES THAT CONCLUDE YOUR TESTIMONY?

A. Yes. Thank you.

EXHIBIT 1

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OUTSIDE PLANT ENGINEERING/CONSTRUCTION CONSULTANT

Expert witness / consultant specializing in the engineering, construction and operation of outside plant telecommunications networks. Solid experience in the overseeing and coordinating the design and outside plant (OSP) engineering and construction responsibilities as an Operations Manager. Also, extensively experienced in OSP engineering design. An effective supervisor of technical personnel and able to manage capital programs and expense budgets within company objective levels. Skilled in coordinating / communicating with departments, major customers and government authorities.

ADIRONDACK TELCOM ASSOCIATES — 1996 – Present

Owner

Expert outside plant engineering and construction consultant/witness

- Provided outside plant local loop expert advice to AT&T and MCI for the HAI Model, a key economic model referenced by the FCC and various state jurisdictions to determine compliance with the Telecommunications Act of 1996 to set Unbundled Network Element prices and to determine the level of the Universal Service Fund.
- Appeared before 14 state jurisdictions on behalf of AT&T and MCI as an expert OSP engineering and construction witness. Testified before Public Service agencies in the states of Colorado, Idaho, Indiana, Iowa, Montana, Minnesota, New Jersey, New Mexico, North Dakota, Ohio, South Dakota, Utah, Washington and Wyoming. Assisted other expert witnesses with testimony in other jurisdictions.
- Provided outside plant local loop expert advise to various "Data Coalitions" that included Covad Communications, @Links Networks, Mpower Communications, Vectris Telecom, IP Communications, New Edge Networks and Broadslate Networks for the establishment of rates for xDSL loops and related elements and services.
- Have filed testimony and have or will be appearing before Public Service Commissions in the states of Alabama, Kansas, Louisiana, and Tennessee on behalf of "Data Coalitions".
- Provided field reviews of OSP facilities at selective locations in Massachusetts for USN Communications Inc.
- Engineered and designed fiber optic transmission network for a private organization in Schroon Lake, New York

FRONTIER COMMUNICATIONS OF AUSABLE VALLEY — 1998 – 2000

Operations Manager/Engineer

- Responsible for all aspects of company operations within service area
- Supervised 7 field technicians, 3 central office technicians and an office sales representative
- Responsible for the engineering, design and construction of all OSP projects, including coordination with other utilities and service providers, preparation and awarding of contractor contracts and securing of material and test equipment.
- Designed and constructed a fiber optic transmission network between central offices.
- Designed and constructed a telecommunications network to meet service requirements for Whiteface Mountain Ski Center and the first Winter Goodwill Games held in February, 2000. This network included the installation of two fiber-fed digital loop carrier systems and also fiber optic digital facilities for live TV broadcasting during the Goodwill Games. This network was designed and constructed in some very challenging terrain and has

positioned the Olympic Regional Development Agency at Whiteface Mountain with one of the most advanced communications networks of any ski area in the country. This fiber optic network also extends to the very summit of Whiteface Mountain to meet the special telecommunications requirements of numerous government agencies.

- Frontier Communications of AuSable Valley received a commendation from the New York State Public Service Commission in recognition of improved customer service levels for 1999.

FRONTIER COMMUNICATIONS OF AUSABLE VALLEY 1996

Contract Outside Plant Engineer and Construction Coordinator

- Designed OSP facilities to meet customer requirements for residential and business customers in the company service area.
- Coordinated and managed the construction of OSP projects, including the ordering of materials, coordination with other utilities and government agencies and administration of construction contracts.

NYNEX (NEW YORK TELEPHONE) 1970-1996

Area Construction / Engineering Operations Manager (1994-1996)

Oversaw OSP construction and engineering operations for the Adirondack District, covering 43 wire centers and a customer base of approximately 188,000 access lines. Supervised 14 first level management and 71 craft personnel responsible for designing and building Outside Plant facilities to meet customer requirements and corporate financial commitments.

- By making sure designs, constructions schedules, purchase orders for equipment and outside plant facilities, and permits were acquired when required, put into service the SONET fiber interoffice ring system on schedule. This upgrade assures that services will not be interrupted, even with downed lines, in the Albany - Glens Falls area. Through the same oversight approach, also assured the successful design/construction of dual fiber interoffice trunk routes between nine Central Offices.

- Improved service standards throughout a large portion of the Adirondacks by overseeing timely completion of the Glens Falls Central Office switch cutover to the new #5ESS technology and a $1.2 million municipal relocation project between Malone and Brainardsville.

- Saw the advantage of deploying fiber optic digital technology when informed by NYS of its plan to move and rebuild one of its Interstate I-87 bridges. Negotiated the change with the Department of Transportation which saved the state, federal government and the company $500,000.

Engineering Manager - Adirondack/Capital South Districts (1990-1994)

Initially supervised the OSP Engineering Design group for the Capital South district, covering 26 wire centers with approximately 200,000 access lines with Albany and several major customers located within the district. In 1992 took over the Adirondack district's 43 wire centers and approximately 185,000 access lines serving the northern 518 area. Supervised up to ten Engineers and 12 Engineering Support (Craft) personnel in satisfying residential and business customer service requirements. Managed the Capital program and related expense budgets within established company objective levels that ranged between $13-$20 million to provide residential, business and interoffice trunk facilities.

- Managed a $10.7 million project for the design and construction of a 117 mile interoffice fiber optic facility between Saranac Lake, Plattsburgh and Glens Falls which now provides SONET Ring capability to all offices North of Glens Falls in the 518 LATA. This required negotiating with New York State Departments of Environmental Conservation and Transportation, and the Adirondack Park Agency to place facilities through some of the most environmentally sensitive geography within the eastern United States. This project won the NYSDEC award for environmental excellence.

- Assigned to manage a problem Engineering Group and, by building confidence in their expertise, established a close, effective team relationship between engineering and other departments, which significantly improved work performance and service results.

- Established solid relationships between the company and such major customers as Blue Cross Blue Shield by making sure that fiber optic upgrades were designed and built to meet customer requirements.

Outside Plant Engineer - Albany/Oneonta (1979-1990)

Other than size, responsibilities the same for both districts. Designed OSP facilities that met customer requirements for residential and business service, including design of digital loop carrier systems and interoffice trunk facilities. Prepared / administered authorizations within the Capital Program. Turf assignments ranged from six to fifteen wire centers.

Construction Control Center Foreman - Oneonta (1976-1979)

Scheduled and supervised field construction operations with the Engineering department and other departments to ensure that commitments were met. Also, coordinated construction operations with other utility companies and municipalities. Maintained accurate labor time reports and material disbursement accounting.

Prior NYNEX Experience (1970-1976)

Started as a Construction Splicing Technician. Promoted to Construction Splicing Foreman, supervising up to 12 Construction Splicing Technicians in 1976.

OTHER WORK EXPERIENCE

Self Employed - Dairy Farmer (1967-1970)
Park Ranger - Central NYS Park Commission (summer 1966)
Crew Foreman - Central NYS Park Commission (1964-1965)

EDUCATION

State University of New York at Cobleskill (1965-1967)
- AAS Degree - Dairy and Food Science, 1967
- Graduated with honors

EXHIBIT 2

(CONTAINS PROPRIETARY INFORMATION)